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EXAMINER	
LAM, KENNETH T	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,029	PARK ET AL.	
	Examiner	Art Unit	
	KENNETH LAM	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09/11/2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed on 09/11/2009. Claims 1-32 are pending in this application and have been considered below.

Claim Rejections - 35 USC § 112

2. Due to applicant's corrections by the amendment, the rejections to claims 27-28 are withdrawn.

Claim Objections

3. The objections to the claims are corrected by the amendment; therefore, the objections to claims 12, 14, 19-21, 24-25, 28, 30, 32 are withdrawn.

Response to Arguments

4. Applicant's arguments with respect to claims 1-32 have been considered but are moot in view of the new ground(s) of rejection due to the amendments change the scope of the invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: ***(See MPEP Ch. 2141)***

a. Determining the scope and contents of the prior art;
b. Ascertaining the differences between the prior art and the claims in issue;
c. Resolving the level of ordinary skill in the pertinent art; and
d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

6. Claims 12-13, 19, 25-27, 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Jun et al. (Jun herein after) (US 6,810,084 B1).

Re Claim 12, the admitted prior art Figure 6 discloses an on-channel repeating apparatus for repeating signal over an on- channel, the on-channel repeater comprising:

a receiving means for receiving a radio frequency (RF) signal (RF Receiving Unit 602);

a demodulating means for demodulating the received RF signal into a baseband signal (Demodulating Unit 604);

an equalizing means for equalizing the baseband signal (Equalizing Unit and FEC Decoding Unit 605);

a modulating means for modulating the equalized baseband signal into an RF signal (Modulating Unit 607); and

a transmitting means for transmitting the modulated RF signal (Transmission Antenna 610).

The admitted prior art disclosed the claimed invention except explicitly teaches a modulating means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal. However, Jun teaches a VSB transmitter comprising means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal (pre-equalizer directly connected to VSB modulator, Figure 5, column 5 lines 1-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the transmitter system as taught by Jun with the on-channel repeater as taught by the admitted prior art to produce the same expected result and to further improve the quality of the transmitted signal.

Re Claim 13, the combined teachings disclose the on-channel repeater as recited in claim 12, the admitted prior art Figure 6 discloses wherein the receiving means includes:

a reception antenna for receiving the RF broadcast signal from the main transmitter (Reception Antenna 601); and

a RF receiving unit for receiving the RF broadcast signal from the reception antenna (RF Receiving Unit 602).

Re Claim 19, the admitted prior art Figure 6 discloses an on-channel repeating method comprising the steps of:

receiving a radio frequency (RF) signal (RF Receiving Unit 602);

demodulating the received RF signal into a baseband signal (Demodulating Unit 604);

equalizing the baseband signal (Equalizing Unit and FEC Decoding Unit 605);

modulating the equalized baseband signal into an RF signal (Modulating Unit 607); and

transmitting the modulated RF signal (Transmission Antenna 610).

The admitted prior art disclosed the claimed invention except explicitly teaches a modulating means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal. However, Jun teaches a VSB transmitter comprising means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal (pre-equalizer directly connected to VSB modulator, Figure 5, column 5 lines 1-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the transmitter system as taught by Jun with the on-channel repeater as taught by the admitted prior art to produce the same expected result and to further improve the quality of the transmitted signal.

Re Claim 25, the combined teachings disclose the on-channel repeating method as recited in claim 19, the admitted prior art Figure 6 discloses wherein the demodulating step includes:

(a) converting the received RF signal into an intermediate frequency (IF) signal (IF Downlink Converting Unit 603); and

(b) demodulating the converted IF signal into the baseband signal (Demodulating Unit 604).

Re Claim 26, the combined teachings disclose the on-channel repeating method as recited in claim 25, the admitted prior art Figure 6 discloses wherein the modulating step includes:

(a') modulating the equalized baseband signal into an intermediate frequency (IF) signal (Modulating Unit 607); and

(b') converting the modulated IF signal into a radio frequency (RF) signal (RF Uplink Converting Unit 608).

Re Claim 27, the combined teachings disclose the on-channel repeating method as recited in claim 26, the admitted prior art Figure 6 discloses wherein the step (a') converts into the IF signalbased on a first reference frequency from a local oscillator, and wherein the step (b') converts into the RF signal based on a second reference frequency from the local oscillator (LO 611).

Re Claim 29, the combined teachings disclose the on-channel repeater as recited in claim 12, the admitted prior art Figure 6 discloses wherein the demodulating means includes down-converting unit for convert the received RF signal into an intermediate frequency (IF) signal (IF Downlink Converting Unit 603); and demodulating

unit for demodulating the converted IF signal into the baseband signal (Demodulating Unit 604).

Re Claim 30, the combined teachings disclose the on-channel repeater as recited in claim 29, the admitted prior art Figure 6 discloses wherein the modulating means includes modulating unit for modulating the equalized baseband signal into an intermediate frequency (IF) signal (Modulating Unit 607); and up-converting unit converting the modulated IF signal into a radio frequency (RF) signal (RF Uplink Converting Unit 608).

Re Claim 31, the combined teachings disclose the on-channel repeater as recited in claim 30, the admitted prior art Figure 6 discloses wherein the on-channel repeater further includes a local oscillator for providing a reference frequency to the down-converting unit and the up-converting unit (LO 611).

7. Claims 1-2, 7-8, 11, 14, 20, 28, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Eberlein et al. (Eberlein herein after) (US 6,973,121 B1) and Jun et al. (Jun herein after) (US 6,810,084 B1).

Re Claim 1, the applicant's admitted prior art Figure 6 discloses an on-channel repeating apparatus for an Advanced Television System Committee (ATSC) terrestrial

digital TV broadcasting service, in which a terrestrial digital television broadcast signal is repeated over an on-channel, the on-channel repeating apparatus comprising:

a receiving unit for receiving a Radio Frequency (RF) broadcast signal from a main transmitter (RF Receiving Unit 602);

a frequency downlink converting unit for converting the received RF broadcast signal into an intermediate frequency (IF) signal based on a first reference frequency (IF Downlink Converting Unit 603);

a demodulating unit for converting the converted IF signal into a baseband signal (Demodulating Unit 604);

an equalizing unit for removing a predetermined signal generated between the main transmitter and the on-channel repeater from the converted baseband signal (Equalizing Unit and FEC Decoding Unit 605);

a modulating unit for converting the baseband signal outputted from the equalizing unit, into an IF signal (Modulating Unit 607);

a frequency uplink converting unit for converting the IF signal into a RF broadcast signal based on a second reference frequency (RF Uplink Converting Unit 608);

a high power amplifying unit for amplifying and repeating the converted RF broadcast signal (High Power Amplifying Unit 609);

a transmitting unit for transmitting the RF broadcast signal outputted from the high power amplifying unit (Transmission Antenna 610).

The applicant's admitted prior discloses the claimed invention except explicitly teaches a specific signal synchronizing unit. However, Eberlein teaches a repeater system comprising:

a signal synchronizing unit for generating the first reference frequency to provide the generated first reference frequency for the IF downlink converting unit to the demodulating unit which shifts the IF signal to the baseband signal, and generating the second reference frequency based on the first reference frequency to provide the generated second reference frequency for the RF uplink converting unit such that the transmission/reception signal are frequency-and-phase synchronized (column 4 line 50 – column 6 line 51).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the repeater system as taught by Eberlein with the on-channel repeating apparatus as taught by the applicant's admitted prior art Figure 6 to further improve the signal accuracy.

The admitted prior art disclosed the claimed invention except explicitly teaches a modulating means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal. However, Jun teaches a VSB transmitter comprising means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal (pre-equalizer directly connected to VSB modulator, Figure 5, column 5 lines 1-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the transmitter system as taught by Jun with the on-channel repeater as taught by the admitted prior art to

produce the same expected result and to further improve the quality of the transmitted signal.

Re Claim 2, the combine teachings disclose the on-channel repeating apparatus as recited in claim 1, the admitted prior art teaches wherein the receiving unit includes:

a reception antenna for receiving the RF broadcast signal from the main transmitter (Reception Antenna 601); and

a RF receiving unit for receiving the RF broadcast signal from the reception antenna (RF Receiving Unit 602).

Re Claim 3, the combine teachings disclose the on-channel repeating apparatus as recited in claim 1, Eberlein discloses wherein the predetermined signal of the equalizing unit includes:

a noise signal and a multi-path signal generated due to a transmission channel between the main transmitter and the on-channel repeating apparatus (column 4 lines 23-49); and

a feedback signal generated due to low isolation of transmission/reception antennas (column 4 lines 50-67).

Re Claim 7, the applicant's admitted prior art discloses an on-channel repeating method of an on-channel repeater, the on-channel repeating method comprising the steps of:

a) receiving a Radio Frequency (RF) broadcast signal from a main transmitter to convert the received RF broadcast signal into an intermediate frequency (IF) signal based on a first reference frequency (RF Receiving Unit 602);

b) converting the downlink-converted IF signal into a baseband signal, and removing a certain predetermined signal generated between a main transmitter and the on-channel repeater, from the converted baseband signal (IF Downlink Converting Unit 60);

c) at the time of transmission, converting the baseband signal without the predetermined signal into an IF signal, and then converting the converted IF signal into a RF broadcast signal based on the second reference frequency based on the first reference frequency (Modulating Unit 607); and

d) amplifying and transmitting the uplink-converted RF broadcast signal (High Power Amplifying Unit 609, Transmission Antenna 610).

The applicant's admitted prior discloses the claimed invention except explicitly teaches a specific signal synchronizing unit. However, Eberlein teaches a repeater system comprising:

converting the baseband signal without the predetermined signal into an IF signal, and then converting the converted IF signal into a RF broadcast signal based on the second reference frequency based on the first reference frequency so as to perform a frequency and phase synchronization with the received broadcast signal (column 4 line 50 – column 6 line 51).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the repeater system as taught by Eberlein with the on-channel repeating apparatus as taught by the applicant's admitted prior art Figure 6 to further improve the signal accuracy.

The admitted prior art disclosed the claimed invention except explicitly teaches a modulating means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal. However, Jun teaches a VSB transmitter comprising means for modulating the equalized baseband signal received directly from the equalizing means into an RF signal (pre-equalizer directly connected to VSB modulator, Figure 5, column 5 lines 1-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the transmitter system as taught by Jun with the on-channel repeater as taught by the admitted prior art to produce the same expected result and to further improve the quality of the transmitted signal.

Re Claim 8, the combined teachings disclose the on-channel repeating method as recited in claim 7, Eberlein discloses wherein the predetermined signal includes:

a noise signal and a multi-path signal generated due to a transmission channel between the main transmitter and the on-channel repeater (column 4 lines 23-49); and

a feedback signal generated due to low isolation of transmission/reception antennas (column 4 lines 50-67).

Re Claim 11, the combined teachings disclose the on-channel repeating method as recited in claim 7, Eberlein discloses wherein the RF broadcast signal of the fourth step is a signal having the same frequency and phase as those of the received RF broadcast signal (column 5 lines 15-51).

Re Claim 14, the admitted prior art discloses the on-channel repeater as recited in claim 12 except explicitly teaches a specific signal synchronizing unit. However, Eberlein teaches a repeater system wherein the demodulation means includes a carrier restoring unit for performing the frequency and phase synchronization with a pilot signal of the received RF signal, and wherein the carrier restoring unit generates a control signal, the control signal being used for modulating the equalized baseband signal into an RF signal (column 4 line 50 – column 6 line 51).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the repeater system as taught by Eberlein with the on-channel repeating apparatus as taught by the applicant's admitted prior art Figure 6 to further improve the signal accuracy.

Re Claim 20, the admitted prior art discloses the on-channel repeating method as recited in claim 19 explicitly teaches a specific signal synchronizing unit. However, Eberlein teaches a repeater system wherein the demodulating step includes performing the frequency and phase synchronization with a pilot signal of the received RF signal,

and generating a control signal, the control signal being used for modulating the equalized baseband signal into an RF signal (column 4 line 50 – column 6 line 51).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the repeater system as taught by Eberlein with the on-channel repeating apparatus as taught by the applicant's admitted prior art Figure 6 to further improve the signal accuracy.

Re Claim 28, the admitted prior art Figure 6 discloses the on-channel repeating method as recited in claim 26 explicitly teaches a specific signal synchronizing unit. However, Eberlein teaches wherein the step (b') includes performing the frequency and phase synchronization with a pilot signal of the down-converted IF signal, and generating a control signal, the control signal being used for modulating the equalized baseband signal into the IF signal (column 4 line 50 – column 6 line 51).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the repeater system as taught by Eberlein with the on-channel repeating apparatus as taught by the applicant's admitted prior art Figure 6 to further improve the signal accuracy.

Re Claim 32, the admitted prior art Figure 6 discloses the on-channel repeater as recited in claim 30 explicitly teaches a specific signal synchronizing unit. However, Eberlein teaches wherein the demodulation unit includes a carrier restoring unit for performing the frequency and phase synchronization with a pilot signal of the converted

IF signal, and wherein the carrier restoring unit generates a control signal, the control signal being used for modulating the equalized baseband signal into the IF signal (column 4 line 50 – column 6 line 51).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the repeater system as taught by Eberlein with the on-channel repeating apparatus as taught by the applicant's admitted prior art Figure 6 to further improve the signal accuracy.

8. Claims 4-6, 15-18, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art, Jun et al. (Jun herein after) (US 6,810,084 B1) and Eberlein et al. (Eberlein herein after) (US 6,973,121 B1) as applied to claims 3, 14, 20 above, and further in view of Ghosh et al. (Ghosh herein after) (US 2002/0154247 A1) and Choi (US 5,502,506).

Re Claim 4, the combined teachings disclose the on-channel repeating apparatus as recited in claim 3, wherein the equalizing unit includes:

The combined teachings disclose the claimed invention expect a specific viterbi decoding unit and equalizer. However, Ghosh teaches a receiver capable of decoding trellis encoded signals comprising:

an input-to-equalizer signal storing unit for storing the signal input from the demodulating unit therein ([0008], [0020]);

a filtering unit for performing channel equalization by repetitively filtering the signal input from the demodulating unit (Forward Equalizer Filter 710, Figure 7);

a modified viterbi decoding unit for detecting a symbol representing decision data from the output signal transmitted through the filtering unit by using a modified viterbi decoding algorithm with a Trace Back Depth TBD being one and a complexity being reduced to output the detected symbol at a decision directed mode ([0015], [0060]);

a FFF tap coefficient renewing unit for renewing a tap coefficient applied to a feedback filter unit (FFF) by using an output signal of the input-to-equalizer signal storing unit and the calculated error signal ([0074]-[0078]); and

a FBF tap coefficient renewing unit for renewing a tap coefficient applied to the feedback filtering unit (FBF) by using the output signal of the modified viterbi decoding unit and the calculated error signal ([0074]-[0078]).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Ghosh with the teachings as taught by the combined references to further improve the decoding performance.

The combined teachings disclose the claimed invention expect a switching unit for selecting an output signal in one of the decision directed mode or the blind mode. However, Choi teaches an apparatus for equalizing television signals comprising:

a statistical data computing unit for computing and outputting necessary statistical error data at a blind mode (column 3 lines 24-40);

a switching unit for selecting an output signal in one of the decision directed mode and the blind mode (column 3 line 59 – column 4 line 6);

an error signal calculating unit for comparing the output signal representing decision data or statistical error data in the decision directed mode or the bind mode selected by the switching unit with an output signal as decision feedback equalization data of the filtering unit to calculate the error signal (column 3 line 11 – column 4 line 32);

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Choi with the teachings as taught by the combined references to further improve the equalization performance.

Re Claim 5, the combined teachings disclose the on-channel repeating apparatus as recited in claim 4, Ghosh discloses wherein the equalizing unit use a viterbi decoder, a modified viterbi decoder, a Soft Output Viterbi Algorithm SOVA decoder and a simple slicer as a symbol detector ([0008], [0071]).

Re Claim 6, the combined teachings disclose the on-channel repeating apparatus as recited in claim 5, Ghosh discloses wherein the equalizing unit uses a training sequence as an output signal thereof at a data duration including the training sequence ([0016], [0072]), and uses an output signal of the symbol detector as an output signal of the on-channel repeater at a data duration excluding training sequence ([0073]).

Re Claim 15, the combined teachings disclose the on-channel repeating apparatus as recited in claim 14 expect a specific viterbi decoding unit and equalizer. However, Ghosh teaches a receiver capable of decoding trellis encoded signals wherein the equalizing means includes:

an input-to-equalizer signal storing unit for storing the signal input from the demodulating means ([0008], [0020]);

a filtering unit for filtering repetitively the signal input from the demodulating means for channel equalization (Forward Equalizer Filter 710, Figure 7);

a symbol detecting unit for detecting a symbol from the signal input from the filtering unit ([0015], [0060]).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Ghosh with the teachings as taught by the combined references to further improve the decoding performance.

The combined teachings disclose the claimed invention expect a switching unit for selecting an output signal in one of the decision directed mode or the blind mode. However, Choi teaches an apparatus for equalizing television signals comprising:

a statistical data computing unit for computing and outputting necessary statistical error data for a blind mode (column 3 lines 24-40);

a switching unit for selecting an output signal in the decision directed mode or in the blind mode (column 3 line 59 – column 4 line 6);

an error signal calculating unit for comparing the output signal selected by the switching unit and the output signal from the filtering unit, and calculating an error

signal; and a tap coefficient renewing unit for renewing a tap coefficient applied to the filtering unit according to the calculated error signal (column 3 line 11 – column 4 line 32);

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Choi with the teachings as taught by the combined references to further improve the equalization performance.

Re Claim 16, the combined teachings disclose the on-channel repeating apparatus as recited in claim 15, Ghosh teaches wherein the filtering unit includes a feedforward filtering (FFF) unit and a feedback filtering (FBF) unit, and wherein the tap coefficient renewing unit includes:

a FFF tap coefficient renewing unit for renewing a tap coefficient applied to the the feedforward filtering (FFF) unit according to the output signal of the input-to-equalizer signal storing unit and the calculated error signal ([0074]-[0078]); and

a FBF tap coefficient renewing unit for renewing a tap coefficient applied to the feedback filtering (FBF) unit according to the output signal of the symbol detecting unit and the calculated error signal ([0074]-[0078]).

Re Claim 17, the combined teachings disclose the on-channel repeater as recited in claim 16, Ghosh teaches wherein the symbol detecting unit is one of a viterbi decoder, a modified viterbi decoder, a Soft Output Viterbi Algorithm (SOVA) decoder and a simple slicer ([0008], [0071]).

Re Claim 18, the combined teachings disclose the on-channel repeating apparatus as recited in claim 17, Ghosh teaches wherein the equalizing means uses a training sequence as an output signal at a data duration with the training sequence ([0016], [0072]), and uses an output signal of the symbol detecting unit as an output signal at a data duration without the training sequence ([0073]).

Re Claim 21, the combined teachings disclose the on-channel repeating method as recited in claim 20, expect a specific viterbi decoding unit and equalizer. However, Ghosh teaches a receiver capable of decoding trellis encoded signals wherein the equalizing step includes:

storing the result signal of the demodulating step ([0008], [0020]);

filtering repetitively the result signal of the demodulating step for channel equalization (Forward Equalizer Filter 710, Figure 7);

detecting a symbol from the result signal of the filtering step ([0015], [0060]).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Ghosh with the teachings as taught by the combined references to further improve the decoding performance.

The combined teachings disclose the claimed invention expect a switching unit for selecting an output signal in one of the decision directed mode or the blind mode. However, Choi teaches an apparatus for equalizing television signals comprising:

computing and outputting necessary statistical error data for a blind mode (column 3 lines 24-40);

selecting an output signal in the decision directed mode or in the blind mode (column 3 line 59 – column 4 line 6);

comparing the result signal selected by the selecting step and the result signal by the filtering step, and calculating an error signal (column 3 line 11 – column 4 line 32); and

renewing a tap coefficient applied to the filtering step according to the calculated error signal (column 3 line 11 – column 4 line 32).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Choi with the teachings as taught by the combined references to further improve the equalization performance.

Re Claim 22, the combined teachings disclose the on-channel repeating method as recited in claim 21, Ghosh teaches wherein the filtering step includes a feedforward filtering (FFF) step and a feedback filtering (FBF) step, and wherein the tap coefficient renewing step includes:

renewing a tap coefficient applied to the the feedforward filtering (FFF) step according to the result signal of the storing step and the calculated error signal ([0074]-[0078]); and

renewing a tap coefficient applied to the feedback filtering (FBF) step according to the result signal by the symbol detecting step and the calculated error signal ([0074]-[0078]).

Re Claim 23, the combined teachings disclose the on-channel repeating method as recited in claim 22, Ghosh teaches wherein in the symbol detecting step, one of a viterbi decoder, a modified viterbi decoder, a Soft Output Viterbi Algorithm (SOVA) decoder and a simple slicer is used as a symbol detecting unit ([0008], [0071]).

Re Claim 24, the combined teachings disclose the on-channel repeating method as recited in claim 23, Ghosh teaches wherein in the equalizing step, a training sequence is used as an output signal at a data duration with the training sequence ([0016], [0072]), and an result signal of the symbol detecting step is used as an output signal at a data duration without the training sequence ([0073]).

9. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art, Jun et al. (Jun herein after) (US 6,810,084 B1) and Eberlein et al. (Eberlein herein after) (US 6,973,121 B1) as applied to claim 7 above, and further in view of Ghosh et al. (Ghosh herein after) (US 2002/0154247 A1)

Re Claim 9, the combined teachings disclose the on-channel repeating method as recited in claim 7 except explicitly teaches a viterbi decoder. However, Ghosh

teaches a receiver capable of decoding trellis encoded signals wherein in the step b), one of a viterbi decoder, a modified viterbi decoder, a SOVA (Soft Output Viterbi Algorithm) decoder and a simple slicer is used as a symbol detector ([0008], [0071]).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the equalizer as taught by Ghosh with the teachings as taught by the combined references to further improve the decoding performance.

Re Claim 10, the combined teachings disclose the on-channel repeating method as recited in claim 9, Ghosh teaches wherein in the step b), a training sequence is used as an output signal of the equalizing unit at a duration including the training sequence ([0016], [0072]), and an output signal of the symbol detector is used as an output signal of an equalizing unit at a duration excluding the training sequence ([0073]).

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 12 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/577,532. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant application discloses an on-channel repeating apparatus for repeating signal over an on-channel (Claim 1 of 10/577,532 discloses on-channel repeater), the on-channel repeater comprising:

a receiving means for receiving a radio frequency (RF) signal (Claim 1 of 10/577,532 discloses a receiving means for receiving a Radio Frequency (RF) broadcast signal);

a demodulating means for demodulating the received RF signal into a baseband signal (Claim 1 of 10/577,532 discloses a demodulating means for demodulating the RF signal received by the receiving means into a baseband signal);

an equalizing means for equalizing the baseband signal (Claim 1 of 10/577,532 discloses a demodulating means for equalizing the baseband signal);

a modulating means for modulating the equalized baseband signal into an RF signal (Claim 1 of 10/577,532 discloses a modulating means for modulating the baseband output signal from the equalizing means into an RF signal); and

a transmitting means for transmitting the modulated RF signal (Claim 1 of 10/577,532 discloses a transmitting means for transmitting the RF signal obtained from the modulation in modulating means).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH LAM whose telephone number is (571)270-1862. The examiner can normally be reached on Mon - Fri 7:30 am - 4:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KENNETH LAM/
Examiner, Art Unit 2611
11/10/2009
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611